

How Many Minutes to Midnight?

I felt very excited as I opened the Occidental College catalog, the summer after graduating from high school. What a treat to look over the course offerings, to dream about the subjects I might study. I chose “Science and Human Values” as the concentration for my general education courses. As I read the list of topics to be covered, it seemed that this nexus would define the challenges society would face in my lifetime.

Of all these issues – from medical ethics to the environment – the one that especially grabbed my attention was dealing with the danger we face from the creation of nuclear weapons.

In 1942, Enrico Fermi and his Manhattan Project colleagues achieved the first self-sustaining nuclear chain reaction, in a makeshift lab in the Stagg Field Stadium at the University of Chicago. Spurred by the fear that Nazi Germany would obtain an ultimate weapon, U.S. scientists then created bombs so devastating that the turn of a key (yes, it’s a key, or actually two keys, not a button) could destroy millions of people, their cities, their land and, through genetics, future generations. In 1945, the atom bomb was tested at Alamogordo, New Mexico.

The atomic bomb, with the “radiance of a thousand suns,” as Manhattan Project Director J. Robert Oppenheimer described it, was an awesome and dark responsibility for humans to handle with our fragile military, political and psychological capacities.

As most of us know, nuclear weapons have been used twice, at Hiroshima and Nagasaki, 60 years ago this August 6 and 9. So this seems like an appropriate time to reflect on how well we’re doing with the responsibility of ensuring that these weapons are never again used.

The Manhattan Project scientists, and their colleagues, including Albert Einstein, first sounded the alarm about

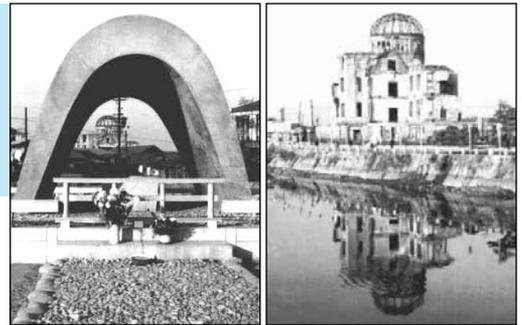
the danger of nuclear weapons. Many of them were horrified by the hundreds of thousands of Japanese killed and maimed by the two blasts, even if they had perhaps hastened the end of the war in the Pacific. They began to share their fears, warning against the building of more nuclear weapons and their potential spread to other countries.

As Russia quickly followed with its own atomic weapon and then the more powerful hydrogen bomb, the scientists undertook initiatives to reduce the dangers of the weapons they had invented. In 1947, just blocks from Stagg Field, the *Bulletin of the Atomic Scientists* was created, with its famous “Doomsday Clock” counting the minutes to midnight. In 1955, the Pugwash Conferences on Science and World Affairs began to bring Eastern and Western scientists together to advocate for nuclear reductions.

Over the years, as nuclear arsenals swelled to tens of thousands, diplomats around the world negotiated many arms control agreements. Partly as a result of their efforts, few additional countries and no terrorist groups obtained the weapons, nor were they used for a third or fourth time.

Today, that framework of agreements is tattered. India and Pakistan have become nuclear powers. North Korea and perhaps Iran are pursuing the weapons, as undoubtedly are al-Qaida and other terrorist groups. Pakistani physicist A.Q. Khan and his network of rogue scientists, who sold nuclear weapons designs to North Korea and other countries, symbolize the growing trade in weapons of mass destruction.

This June, in New York, the Non-Proliferation Treaty Review Conference, designed to strengthen the main global agreement against the spread of nuclear weapons, ended in failure, after delegates



The Hiroshima Memorial Cenotaph (left) and A-bomb Dome.

Photos courtesy of Peter Rance

spent weeks arguing about inconsequential issues. The Bush administration sent only a low-level official as the U.S. representative, sidestepping a leadership role.

Stronger global measures to diminish the nuclear danger have always come from citizens and groups like the nuclear scientists who organized and pressured governments to take needed steps. But it struck me, while at the University of Chicago this May for the memorial service for Ruth Adams, the long-time editor of the *Bulletin of the Atomic Scientists*, how the generation of scientists who created the bomb, then sought to contain it, is passing from the scene. The parents of today’s young people weren’t even alive in 1945, so the living memory of what happened at Hiroshima and Nagasaki is fading. The vigil against the spread and use of nuclear weapons is an ongoing effort. Who will pick up this mantle of responsibility?

There are a few hopeful signs. One campus group, Student Pugwash, asks science students to sign an oath stating “I will not use my education for any purpose intended to harm human beings or the environment...” Five thousand students in 60 countries have signed this pledge.

But the movement to reduce nuclear arsenals and keep the weapons from spreading is all but dormant today, lulled perhaps by the end of the Cold War, or discouraged by the seeming hopelessness of affecting the policies of governments or the actions of terrorist groups.

Meanwhile, tens of thousands of nuclear weapons still exist, and terrorist groups are intensifying their efforts to steal or build weapons of mass destruction.

Can you hear the ticking? Ω